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STEVEN I. WEISBURD
DICKSTEIN, SHAPIRO, MORIN & OSHINSKY, LLP
1177 AVENUE OF THE AMERICAS
41ST FLOOR
NEW YORK, NY 10036-2714

EXAMINER	
LELE, TANMAY S	
ART UNIT	PAPER NUMBER
2684	15

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/464,520	NAKAYAMA, MASAHIKO
	Examiner	**Art Unit**
	Tanmay S Lele	2684

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *3,5,6,15 and 16* is/are allowed.

6)☒ Claim(s) *1,2,4,7-14 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Arguments

1. Applicant's arguments with respect to claims 1 – 17 have been considered but are moot in view of the new ground(s) of rejection.

DETAILED ACTION

Allowable Subject Matter

2. Claims 3, 5, 6, 15, and 16 are allowed.

Regarding claims 3, the present invention is of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of baseband filters for respectively limiting bands of the respective baseband input thereto; a plurality of level adjusting circuits for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of control signals to output the signals; an adding circuit adding and code-multiplexing the plurality of baseband signals outputted from said respective level adjusting circuits to produce one baseband signal; a D/A converting circuit for converting the baseband signal which is a digital signal outputted from said adding circuit into an analog signal; a gain setting circuit that: calculates, for respective said level adjusting circuits, a gain set value with which an amplitude value of the baseband signal outputted from said adding circuit is adjusted to an amplitude value matching a dynamic range of said D/A converting circuit, said gain set value is based on the number of transmission codes, which is the number of multiplexed baseband signals, and said gain set value based on interchannel ratio information, said interchannel ratio information specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed, and notifies said level adjusting circuit of

the gain set values with said plurality of control signals. The closest prior art, Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) teach of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of baseband filters for respectively limiting bands of the respective baseband input thereto; a plurality of level adjusting circuits for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of control signals to output the signals; an adding circuit adding and code-multiplexing the plurality of baseband signals outputted from said respective level adjusting circuits to produce one baseband signal; a D/A converting circuit for converting the baseband signal which is a digital signal outputted from said adding circuit into an analog signal; a gain setting circuit that: calculates, for respective said level adjusting circuits, a gain set value with which an amplitude value of the baseband signal outputted from said adding circuit is adjusted to an amplitude value matching a dynamic range of said D/A converting circuit, said gain set value is based on the number of transmission codes, which is the number of multiplexed baseband signals, and notifies said level adjusting circuit of the gain set values with said plurality of control signals, but alone or in combination with other prior art, do not teach of said gain set value based on interchannel ratio information, said interchannel ratio information specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed.

Regarding claim 5, the present invention is of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of baseband filters for respectively limiting bands of the respective

baseband signals input thereto; a plurality of first level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of first control signals to output the signals; adding means for adding and code-multiplexing the plurality of baseband signals outputted from said respective first level adjusting means to produce one baseband signal; second level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a second control signal to output the signal; D/A converting means for converting the baseband signal which is a digital signal outputted from said second level adjusting into an analog signal; and gain setting means for outputting to said respective first level adjusting means the first control signals for adjusting amplitude ratios of the respective baseband signals in accordance with interchannel ratio information for specifying amplitude ratios of the respective baseband signals when the plurality of baseband signals are multiplexed, for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal. The closest prior art, Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) teach of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto; a plurality of first level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective

baseband filters based on a plurality of first control signals to output the signals; adding means for adding and code-multiplexing the plurality of baseband signals outputted from said respective first level adjusting means to produce one baseband signal; second level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a second control signal to output the signal; D/A converting means for converting the baseband signal which is a digital signal outputted from said second level adjusting into an analog signal; and gain setting means for outputting to said respective first level adjusting means the first control signals, for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal, but alone or in combination with other prior art do not teach of for adjusting amplitude ratios of the respective baseband signals in accordance with interchannel ratio information for specifying amplitude ratios of the respective baseband signals when the plurality of baseband signals are multiplexed.

Regarding claim 6, the present invention is of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of first level adjusting means for respectively adjusting amplitude values of said respective baseband signals input thereto based on a plurality of first control signals; adding means for adding and code-multiplexing the plurality of baseband signals outputted from said respective first level adjusting means to produce one baseband signal; a baseband filter for limiting a band of the baseband signal produced by said adding means; second

level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a second control signal to output the signal; D/A converting means for converting the baseband signal which is a digital signal outputted from said second level adjusting means into an analog signal; and gain setting means for outputting to said respective first level adjusting means the first control signals for adjusting an amplitude ratio of the respective baseband signals in accordance with interchannel ratio information for specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed, for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal. The closest prior art, Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) teach of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising: a plurality of first level adjusting means for respectively adjusting amplitude values of said respective baseband signals input thereto based on a plurality of first control signals; adding means for adding and code-multiplexing the plurality of baseband signals outputted from said respective first level adjusting means to produce one baseband signal; a baseband filter for limiting a band of the baseband signal produced by said adding means; second level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a second control signal to output the signal; D/A converting means for converting the baseband signal

which is a digital signal outputted from said second level adjusting means into an analog signal; and gain setting means for outputting to said respective first level adjusting means the first control signals, for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal but alone or in combination with other prior art do not teach of for adjusting an amplitude ratio of the respective baseband signals in accordance with interchannel ratio information for specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed.

Regarding claim 15, the present invention is of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising: limiting bands of the respective baseband signals input thereto; adjusting respective amplitude values of the plurality of baseband signals with the limited bands based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed; adding and code-multiplexing the respective baseband signals after the adjustment of the amplitude values to produce one baseband signal; calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals; adjusting the amplitude value of the code-multiplexed baseband signal based on the gain set value; and D/A converting the baseband signal after the adjustment of the

amplitude value based on the gain set value into an analog signal. The closest prior art Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) teach of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising: limiting bands of the respective baseband signals input thereto; adjusting respective amplitude values of the plurality of baseband signals with the limited bands; adding and code-multiplexing the respective baseband signals after the adjustment of the amplitude values to produce one baseband signal; calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals; adjusting the amplitude value of the code-multiplexed baseband signal based on the gain set value; and D/A converting the baseband signal after the adjustment of the amplitude value based on the gain set value into an analog signal, but alone or in combination with other prior art, do not teach of [adjusting respective amplitude values of the plurality of baseband signals with the limited bands] based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed.

Regarding claim 16, the present invention is of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising: adjusting respective amplitude values of the respective baseband signals input thereto based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed; adding and code-multiplexing the respective baseband signals after the

adjustment of the amplitude values to produce one baseband signal; limiting a band of the code-multiplexed baseband signal; calculating a gain set value with which an amplitude value of the baseband signal with limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals; adjusting the amplitude value of the baseband signal with the limited band based on the gain set value; and D/A converting the baseband signal after the adjustment of the amplitude value based on the gain set value into an analog signal. The closest prior art Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) teach of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising: adjusting respective amplitude values of the respective baseband signals input thereto; adding and code-multiplexing the respective baseband signals after the adjustment of the amplitude values to produce one baseband signal; limiting a band of the code-multiplexed baseband signal; calculating a gain set value with which an amplitude value of the baseband signal with limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals; adjusting the amplitude value of the baseband signal with the limited band based on the gain set value; and D/A converting the baseband signal after the adjustment of the amplitude value based on the gain set value into an analog signal but alone or in combination with other prior art, do not teach of [adjusting respective amplitude values of the respective baseband signals input thereto] based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed.

Specification

3. The abstract of the disclosure is objected to because of the inclusion of legal phraseology (as stated below in number 3). Correction is required. See MPEP § 608.01(b).

4. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Information Disclosure Statement

5. The information disclosure statement filed 24 April 2000 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the cited Japanese documents were not originally provided (note also, it is assumed that un-titled "P/1878-135" document is the mentioned "Japanese Office Action" listed on the PTO-1449). It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claim 7 is rejected under 35 U.S.C. 102(e) as being anticipated by Uesugi (Uesugi, US Patent No. 6,018,552).

Regarding claim 7, Uesugi teaches of a level adjusting circuit (Figure 16) comprising: a plurality of bit shifters that shift input baseband signals to the right by different certain bits (Figure 16 and column 12, lines 55 – 59); a plurality of switches for selecting outputs from said respective bit shifters in accordance with a desired gain desired to be set (Figure 12 and column 12, lines 66 – 67); and an adder for adding outputs from said respective switches for output as one signal (Figure 16 and column 12, lines 59 – 66).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1, 2, 4, 8, and 10 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869).

Regarding claims 1 and 11, Kato teaches of a baseband signal multiplexing circuit and method for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), comprising: adding means for adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59); level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a control signal to output the signal (Figure 2 and starting column 3, line 65 and ending column 4, line 5); and gain setting means for calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said level adjusting means of the gain set value with said control signal (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto; D/A converting means for converting the baseband signal which is a digital signal [outputted from said level adjusting means into an analog signal]; [adding means for adding and code-multiplexing the plurality of baseband signals] with the bands limited by said respective baseband filters [to produce one baseband signal]; and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); D/A converting means for converting the baseband signal which is a digital signal [outputted from said level adjusting means into an analog signal] (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60; note that the FIR filters also perform the function the "level adjusting means" as detailed in column 5, lines 58 – 60); [adding means for adding and code-multiplexing the plurality of baseband signals] with the bands limited by said respective baseband filters [to produce one baseband signal] (Figure 2 and column 5, lines 51 – 67).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claims 2 and 12, Kato teaches of a baseband signal multiplexing circuit and method for multiplexing a plurality of baseband signals spread with different spread codes into

one baseband signal (Figure 2), comprising: adding means for adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59); and gain setting means for calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said level adjusting means of the gain set value with said control signal (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto; a plurality of level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a control signal to output the signals (though it should be noted that Kato does allude to "plurality of apparatuses" in column 10, lines 34 – 39); D/A converting means for converting the baseband signal which is a digital signal outputted from said adding means into an analog signal; and with which an amplitude value of the baseband signal outputted from said adding means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); D/A converting means for converting the baseband signal which is a digital signal outputted from said adding means into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60; [adding means for adding and code-multiplexing the plurality of baseband signals] outputted

from said respective level adjusting means [to produce one baseband signal] (Figure 2 and column 5, lines 51 – 67) and a plurality of level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a control signal to output the signals (Figure 2 and column 5, lines 51 – 61).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claim 4, Kato teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), comprising: adding means for adding and code-multiplexing the respective baseband signals input thereto to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59); a level adjusting means for adjusting an amplitude value of the baseband signal based on a control signal to output the signal (Figure 2 and starting column 3,

line 65 and ending column 4, line 5); and gain setting means for calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals and, for notifying said level adjusting means of the gain set value with said control signal (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of a baseband filter for limiting a band of the baseband signal produced by said adding means; D/A converting means for converting the baseband signal which is a digital signal outputted from said level adjusting means into an analog signal; [a level adjusting means for adjusting an amplitude value of the baseband signal] with the band-limited by said baseband filter [based on a control signal to output the signal]; and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of a baseband filter for limiting a band of the baseband signal produced by said adding means (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); D/A converting means for converting the baseband signal which is a digital signal outputted from said level adjusting means into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60; note that the FIR filters also perform the function the "level adjusting means" as detailed in column 5, lines 58 – 60); [a level adjusting means for adjusting an amplitude value of the baseband signal] with the band-limited by said baseband filter [based on a control signal to output the signal] (Figure 2 and column 5, lines 51 – 67).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claim 8, Kato teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), comprising: an adder adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59); and a gain setting circuit calculating a gain set value based on the number of transmission codes which the number of multiplexed baseband signals and said gain setting circuit further notifying a level adjusting circuit of the gain set value with said control signal (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of a plurality of baseband filters respectively limiting bands of the respective baseband signals input thereto, and adjusting amplitude values of the respective baseband signals based on a control signal to output the signals; [an adder adding and

code-multiplexing the plurality of baseband signals] with the bands limited by said respective baseband filters [to produce one baseband signal]; a D/A converter converting the baseband signal which is a digital signal outputted from said adder into an analog signal; and with which an amplitude value of the baseband signal outputted from said adding circuit is adjusted to an amplitude value matching a dynamic range of said D/A converter (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60) and adjusting amplitude values of the respective baseband signals based on a control signal to output the signals (Figure 2, column 5, lines 58 – 60); a D/A converter converting the baseband signal which is a digital signal outputted from said adder into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); [an adder adding and code-multiplexing the plurality of baseband signals] with the bands limited by said respective baseband filters [to produce one baseband signal] (Figure 2 and column 5, lines 51 – 67).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value

matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claim 10, Kato teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), said method comprising the steps of: calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of with which an amplitude value of a multiplexed baseband signal matches a dynamic range in D/A conversion and adjusting the amplitude value of the code multiplexed baseband signal prior to the D/A conversion based on the gain set value.

In a related art dealing with spread spectrum communication systems, Lee teaches of a adjusting the amplitude value of the code multiplexed baseband signal prior to the D/A conversion based on the gain set value (Figure 2, column 5, lines 51 – 60).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claim 13, Kato teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), said method comprising the steps of: calculating, for the respective baseband signals, gain set values based on the number of transmission codes which is the number of multiplexed baseband signals (Figure 2 and starting column 3, line 65 and ending column 4, line 5); adjusting the amplitude values of the plurality of baseband signals based on the gain set values (Figure 2 and starting column 3, line 65 and ending column 4, line 5); adding and code-multiplexing the plurality of baseband signals after the adjustment of the amplitude values to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59).

Kato does not specifically teach of limiting bands of the respective baseband signals input thereto; D/A converting the baseband signal after the code-multiplexing into an analog signal; [adjusting the amplitude values of the plurality of baseband signals] with the limited bands [based on the gain set values]; and with which amplitude values of the plurality of baseband signals with the limited bands match a dynamic range in D/A conversion (note the

brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of limiting bands of the respective baseband signals input thereto (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); D/A converting the baseband signal after the code-multiplexing into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); and [adjusting the amplitude values of the plurality of baseband signals] with the limited bands [based on the gain set values] (Figure 2 and column 5, lines 51 – 67; note that the FIR filters also perform the function the "adjusting the amplitude values of the baseband signal" as detailed in column 5, lines 58 – 60).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Regarding claim 14, Kato teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), said method comprising the steps of adding and code-multiplexing the respective baseband signals input thereto to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59); calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals (Figure 2 and starting column 3, line 65 and ending column 4, line 5); adjusting the amplitude value of the baseband signal based on the gain set value (Figure 2 and starting column 3, line 65 and ending column 4, line 5).

Kato does not specifically teach of D/A converting the baseband signal after the adjustment of the amplitude value into an analog signal; limiting a band of the code-multiplexed baseband signal; and with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion

In a related art dealing with spread spectrum communication systems, Lee teaches of limiting a band of the code-multiplexed baseband signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); D/A converting the baseband signal after the adjustment of the amplitude value into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); and [adjusting the amplitude value of the baseband signal] with the limited band [based on the gain set value] (Figure 2 and column 5, lines 51 – 67; note that the FIR filters also perform the function the "adjusting the amplitude values of the baseband signal" as detailed in column 5, lines 58 – 60).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques, for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

10. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) as applied to claim 8 above, and further in view of Rappaport (Rappaport, "Wireless Communications," Prentice Hall Publications).

Regarding claim 9, Kato in view of Lee teach all the claimed limitations as recited in claim 8. Lee teaches wherein each of said respective baseband filters are FIR filters but does not specifically teach of includes: a plurality of delay elements connected in series, for delaying input signals by a certain time period to output the signals as tap outputs; a plurality of coefficient multipliers, for multiplying each of the tap outputs by a filter coefficient of a plurality of preset filter coefficients that is specified by a control signal; and an adder for adding a

plurality of output signals from said respective coefficient multipliers to output the resulting signal.

In a related art dealing with FIR filter implementation, Rappaport teaches of a plurality of delay elements connected in series, for delaying input signals by a certain time period to output the signals as tap outputs (Figure 6.6 and pages 310 – 311); a plurality of coefficient multipliers, for multiplying each of the tap outputs by a filter coefficient of a plurality of preset filter coefficients that is specified by a control signal (Figure 6.6 and pages 310 – 311); and an adder for adding a plurality of output signals from said respective coefficient multipliers to output the resulting signal (Figure 6.6 and pages 310 – 311).

It would have been obvious to one skilled in the art at the time of invention to have used in Kato and Lee's multi-channel spread-spectrum device, Rappaport's FIR implementation, for the purpose of mitigating ISI and thus canceling interference, as taught by Rappaport.

11. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kato et al. (Kato, US Patent No. 6,122,295) in view of Lee et al. (Lee, US Patent 5,712,869) and further in view of Rappaport (Rappaport, "Wireless Communications," Prentice Hall Publications).

Regarding claim 17, Kato teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal (Figure 2), said method comprising the steps of calculating a gain set value based on the number of transmission codes which is the number of multiplexed baseband signals (Figure 2 and starting column 3, line 65 and ending column 4, line 5); adding and code-multiplexing the plurality of baseband signals with the amplitude values to produce one baseband signal (Figure 2 and column 3,lines 60 – 64 and column 3, lines 46 – 59).

Kato does not specifically teach of with which amplitude values of the respective baseband signals input thereto match a dynamic range in D/A conversion; limiting bands of the input respective baseband signals, and adjusting the amplitude values of the respective baseband signals based on the gain set value by selecting a filter coefficient to be multiplied by each of tap outputs obtained by delaying the input baseband signals by a certain time period; [adding and code-multiplexing the plurality of baseband signals] with the limited bands [and the adjusted amplitude values to produce one baseband signal]; and converting the code-multiplexed baseband signal which is a digital signal into an analog signal (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with spread spectrum communication systems, Lee teaches of limiting bands of the input respective baseband signals, and adjusting the amplitude values of the respective baseband signals (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60; note this is completed with the use of FIR filters); converting the code-multiplexed baseband signal which is a digital signal into an analog signal (Figure 2, column 4, lines 24 – 39 and column 5, lines 51 – 60); [adding and code-multiplexing the plurality of baseband signals] with the limited bands [and the adjusted amplitude values to produce one baseband signal] (Figure 2 and column 5, lines 51 – 67; note that the FIR filters also perform the function the "adjusting the amplitude values of the baseband signal" as detailed in column 5, lines 58 – 60).

It would have been obvious to one skilled in the art at the time of invention to have included into Kato's multi-channel communication system, Lee's spread spectrum techniques,

for the purposes of providing better synchronization and minimization of code acquisition time thus enhancing the radio's performance, as taught by Lee.

Kato in view of Lee do not specifically teach of with which amplitude values of the respective baseband signals input thereto match a dynamic range in D/A conversion and; [limiting bands of the input respective baseband signals, and adjusting the amplitude values of the respective baseband signals based on the gain set value] by selecting a filter coefficient to be multiplied by each of tap outputs obtained by delaying the input baseband signals by a certain time period (note the brackets are used for clarity in grammar and it is believed these limitations have been addressed in the above cited art).

In a related art dealing with FIR filter implementation, Rappaport teaches of by selecting a filter coefficient to be multiplied by each of tap outputs obtained by delaying the input baseband signals by a certain time period (Figure 6.6 and pages 310 – 311).

It would have been obvious to one skilled in the art at the time of invention to have used in Kato and Lee's multi-channel spread-spectrum device, Rappaport's FIR implementation, for the purpose of mitigating ISI and thus canceling interference, as taught by Rappaport.

Kato in view of Lee and Rappaport, do not specifically teach of and with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means (though as stated, Lee teaches of limiting peaks before D/A conversion, as seen in Figure 2 and column 5, lines 58 – 61).

It would have been obvious to one skilled in the art at the time of invention, to have had Lee's FIR filters perform level adjusting to match the dynamic range of the D/A converter, for the purposes of proper conversion from digital domain to analog.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanmay S Lele whose telephone number is (703) 305-3462. The examiner can normally be reached on 9 - 6:30 PM Monday – Thursdays and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay A. Maung can be reached on (703) 308-7745. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Tanmay S Lele
Examiner
Art Unit 2684

tsl
October 2, 2003

NAY MAUNG
SUPERVISORY PATENT EXAMINER